



US005489923A

**United States Patent** [19][11] **Patent Number:** **5,489,923****Marshall et al.**[45] **Date of Patent:** **\*Feb. 6, 1996**

[54] **METHOD AND APPARATUS FOR  
CALIBRATING AN OPTICAL COMPUTER  
INPUT SYSTEM**

[56] **References Cited****U.S. PATENT DOCUMENTS**

[75] Inventors: **Roger N. Marshall**, Solana Beach;  
**Lane T. Hauck**, San Diego; **Leonid  
Shapiro**, Lakeside; **Jeffrey W. Busch**,  
San Diego; **Eric S. Stevens**, El Cajon,  
all of Calif.

[73] Assignee: **Proxima Corporation**, San Diego,  
Calif.

[\*] Notice: The term of the patent shall not extend  
beyond the expiration date of Pat. No.  
5,181,015.

[21] Appl. No.: **154,817**

[22] Filed: **Nov. 19, 1993**

**Related U.S. Application Data**

[60] Continuation of Ser. No. 955,831, Oct. 2, 1992, abandoned,  
which is a division of Ser. No. 611,416, Nov. 9, 1990, Pat.  
No. 5,181,015, which is a continuation-in-part of Ser. No.  
433,029, Nov. 7, 1989, abandoned.

[51] **Int. Cl.<sup>6</sup>** ..... **G09G 5/00**

[52] **U.S. Cl.** ..... **345/156; 345/158; 356/375**

[58] **Field of Search** ..... **345/156, 157,  
345/158, 87, 7, 8; 434/323, 324, 337; 356/375;  
353/122, 28, 43; 248/170, 181**

3,855,096	5/1975	Inuiya .....	340/709
4,280,135	7/1981	Schlossberg .....	358/93
4,576,481	3/1986	Hansen .....	356/375
4,724,480	2/1988	Hecker et al. ....	356/375
4,794,430	12/1988	Whittaker et al. ....	340/782
4,808,980	2/1989	Drumm .....	340/707
4,836,671	6/1989	Bautista .....	356/375
4,846,694	7/1989	Erhardt .....	340/707
4,886,230	12/1989	Jones et al. ....	248/170
4,930,888	6/1990	Freisleben .....	340/705

*Primary Examiner*—Richard Hjerpe

*Assistant Examiner*—Xiao M. Wu

*Attorney, Agent, or Firm*—Bernard L. Kleinke; Jerry R.  
Potts

[57] **ABSTRACT**

A method and apparatus facilitates the alignment and light sensitivity adjustment of an optical computer input system, which includes a user generated light directed onto a screen bearing a computer generated image, to convey information to the computer interactively by the user, even in a darkened room. The system discriminates between the user generated image, and the computer generated image. Devices facilitate the proper alignment of the system with the screen, as well as proper light sensitivity adjustments.

**19 Claims, 12 Drawing Sheets**